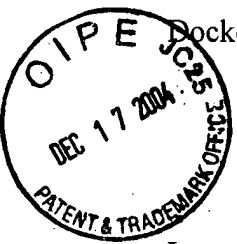


AF IZW



Pocket No.: 50432-022 (F0379)

PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of	:	Customer Number: 20277
	:	
Lu YOU, et al.	:	Confirmation Number: 5047
	:	
Application No.: 09/785,445	:	Group Art Unit: 2811
	:	
Filed: February 20, 2001	:	Examiner: Vu, Hung K.
	:	
For: SINGLE DAMASCENE INTEGRATION SCHEME FOR PREVENTING COPPER CONTAMINATION OF DIELECTRIC LAYER		

REPLY BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22202

Sir:

This Reply Brief is submitted under 37 C.F.R. § 41.41 in response to the EXAMINER'S ANSWER dated October 20, 2004.

The Examiner's response to Appellants' arguments submitted in the Appeal Brief of July 29, 2004, raises additional issues and underscores the factual and legal shortcomings in the Examiner's rejections. In response, Appellants rely upon the arguments presented in the Appeal Brief of July 29, 2004, and the arguments set forth below.

Appellants note the Examiner comments on page 2 of the Examiner's Answer regarding the Grouping of Claims in which the Examiner referred to 37 C.F.R. 1.192(c)(7). Effective September 13, 2004, changes to many of the regulations regarding appeals have been effected, included canceling 37 C.F.R. 1.192. As part of these changes, the groupings of claims

requirement have been eliminated. Therefore, the Examiner's assertion regarding the grouping of claims is moot. Furthermore, notwithstanding the Examiner's implied assertion that the patentability of claims 3 and 4 have not been separately advocated, Appellants respectfully disagree.

In the Appeal Brief of July 29, 2004, Appellants argued that feature 16 of Zhou does not identically describe the claimed "first diffusion barrier layer." The Examiner's response to this argument, found in the first paragraph on page 5 of the Examiner's Answer, is as follows:

This argument is not convincing because it is well-recognized in the semiconductor art that the etch stop layer (16) of Zhou et al. can function as a diffusion layer. That is layer (16) can act either as the etch stop layer to protect the metal layer (14) from etching, and at the same time, as the diffusion barrier to prevent the metal layer (14) from diffusing into the subsequently formed dielectric layer. Appellant has not provided any evidence that the etch stop layer (16) of Zhou et al. cannot function as the diffusion layer. In absence of such evidence, it is prima facie obvious that the etch stop layer of Zhou et al. also acts as the diffusion barrier.

Despite the Examiner's assertion that "it is well-recognized in the semiconductor art that the etch stop layer (16) of Zhou et al. can function as a diffusion layer," the Examiner has failed to provide any factual support for the notion that an etch stop layer inherently, i.e. necessarily always acts as a diffusion layer. Rather than discharge the initial burden of providing a factual basis to support the inherency theory, the Examiner improperly attempts to shift the burden to Appellants to "[provide] evidence that the etch stop layer (16) of Zhou et al. cannot function as the diffusion layer."

Appellants do not gainsay that certain etch stop layers in certain instances can be considered diffusion barrier layers. The Examiner referred to layer 76 in Li, as teaching a layer that is recognized as both an etch stop and as a diffusion barrier layer. However, Li fails to teach that all etch stop layers universally act as a diffusion barrier under all conditions. Furthermore, since Li fails to teach the particular material from which the passivation layer 76 is formed, the capability of

the organic stop layer 16 of Zhou acting as a diffusion barrier cannot be implied from the passivation layer 76 of Li. The Examiner also referred to Appellants' specification, which states that layer 111 can function as an etch stop layer or as a diffusion layer. The Examiner's references to layer 76 in Li and layer 111 in Appellants' specification, however, fail to address the critical question as to whether or not the specific organic stop layer 16 disclosed and described by Zhou necessarily functions as a diffusion layer.

The Examiner failed to provide any objective evidence to establish that the specific organic stop layer 16 disclosed by Zhou necessarily functions as a diffusion barrier layer. The Examiner also failed to proffer any objective evidence to support the notion that all etch stop layers necessarily function as diffusion barrier layers under all conditions. Absent any such facts, there is no basis upon which to determine that the specific organic stop layer 16 disclosed by Zhou necessarily functions as a diffusion layer. Appellants submit that Zhou fails to identically disclose the claimed first diffusion barrier layer recited in claim 4.

In the Appeal Brief of July 29, 2004, Appellants also argued that feature 20 of Zhou is not equivalent to suggest the first etch stop layer of the claimed invention. Instead, Zhou teaches that feature 20 is a dielectric layer. The Examiner's response to this argument, found in the second paragraph on page 5 of the Examiner's Answer, is as follows:

This argument is not convincing because Zhou et al. discloses, at Col. 3, lines 8-10, a dielectric layer (20) can be comprised of one, or several insulating layers and/or etch stop layers. Therefore, it clearly shows that the dielectric layer (20) can be the etch stop layer and the etch stop layer can be the dielectric layer.

The Examiner misinterpreted the teachings found in column 3, lines 8-10 of Zhou. Zhou does not teach that the "dielectric layer (20) can be comprised of one, or several insulating layers and/or

etch stop layers," as asserted by the Examiner. Instead, in column 3, line 8, Zhou initially refers to the "dielectric layer (e.g., 20 24)" as being a combination of layers 20 and 24. In the immediately following sentence, Zhou then states that "the dielectric layer can be comprised of only one, or several insulating layers and/or etch stop layers." Therefore, the specific citation in Zhou upon which the Examiner relies is directed to the whole dielectric layer, which includes dielectric layers 20, 24 and etch stop layers 18, 22 (see Fig. 1 of Zhou), and is not directed to only a portion of the whole dielectric layer, i.e., "dielectric layer 20 (lower dielectric layer)."

With regard to the rejection of claim 3 under 35 U.S.C. § 103 for obviousness based upon Zhou in view of Li, in the Appeal Brief of July 29, 2004, Appellants argued that one having ordinary skill in the art would not have been motivated to modify the alleged second etch stop layer of Zhou in view of Li because to do so would negate the ability of the second etch stop layer to act as an etch stop layer. The Examiner's response to this argument, found in the first paragraph on page 6 of the Examiner's Answer, is as follows:

Appellant argued, at pages 8 and 9 of the Remarks, that if layer 18 of Zhou et al. is modified to be formed from silicon oxide then how could a silicon oxide layer (18) act to stop the etching of a silicon oxide layer (20)? This argument is not convincing for the following reasons: first, it is noted that Zhou et al. discloses, at Col. 3, lines 8-22, that the first etch stop layer (20) can be composed of any known dielectric material, doped silicon oxide or silicon oxide. Therefore, the first etch stop layer (20) is not necessarily composed of silicon oxide. Second, the second etch stop layer (18) is used as the supplemental etch stop layer in case the first etch stop layer (20) is not able to stop the etching.

The Examiner notes correctly that Zhou discloses that the lower dielectric layer 20 is "composed of any known dielectric materials, or silicon oxide and is most preferably composed of SiO₂" (column 3, lines 17-19). The Examiner then appears to argue in the alternative: (i) the lower dielectric layer 20 can be formed from a material different than silicon oxide and (ii) even if the material is silicon oxide, the asserted second etch stop layer 18 can be used as a supplemental etch stop layer to the asserted first etch stop layer 20.

With regard to the Examiner's first argument, Applicant notes that the Examiner has failed to establish any motivation for modifying the preferred disclosure of Zhou (i.e., the lower dielectric layer 20 is formed from silicon oxide) to form the lower dielectric layer 20 from a material other than silicon oxide while at the same time modifying the passivation layer 18 of Zhou to be formed from silicon oxide. Furthermore, although the Examiner asserts Li teaches that silicon oxide is interchangeable with silicon nitride when used as an etch stop, the Examiner failed to establish that silicon oxide is interchangeable with silicon nitride when used as a passivation layer. Therefore, beyond asserting that silicon oxide is interchangeable with silicon nitride when used as an etch stop, the Examiner has failed to establish any realistic motivation to modify Zhou in view of Li to arrive at the claimed combination of layers recited in claim 4.

The Examiner's second argument lacks factual support. The Examiner argues that if the two layers (i.e., 18 and 20) were formed from the same material, then one layer could act as a supplemental etch stop layer in case the first etch stop layer fails to stop the etching, but the Examiner has failed to supply any factual support for this assertion. Why would one skilled in the art have been motivated to form two separate layers, one layer on and contacting the other layer, while both layers are formed from the same material, particularly when one of the two layers could be simply made thicker? An answer to this question is not apparent from the Examiner's comments and for the reasons previously stated. Appellants therefore respectfully submit that one having ordinary skill in the art would not have been motivated to modify the alleged second etch stop layer of Zhou in view of Li to arrive at the invention recited in claim 3.

For the reasons set forth in the Appeal Brief of July 29, 2004, and for those set forth herein,

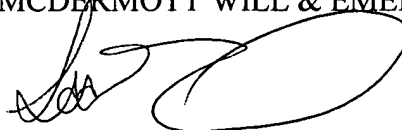
Application No.: 09/785,445

Appellants respectfully solicit the Honorable Board to reverse the Examiner's rejections under 35 U.S.C. §§ 102, 103.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

MCDERMOTT WILL & EMERY LLP

A handwritten signature in black ink, appearing to read 'Scott D. Paul', is written over the firm name.

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